



United States  
Department  
of Agriculture

Forest Service

Rocky Mountain  
Research Station

Research Note  
RMRS-RN-22-3-WWW

September 2004

## ***Fuels Planning: Science Synthesis and Integration***

### **Forest Structure and Fire Hazard Fact Sheet: 3**

## **Visualizing Forest Structure and Fuels**



Pacific Northwest  
Research Station



North Central  
Research Station

### *Synthesizing Scientific Information for Fire and Fuels Project Managers*

The information for this fact sheet was provided by Morris Johnson, Pacific Northwest Research Station, USDA Forest Service.

Forest Structure and Fire Hazard  
Team Leader

**David L. Peterson**

USDA Forest Service  
PNW Research Station

400 N. 34th Street, Suite 201  
Seattle, WA 98103

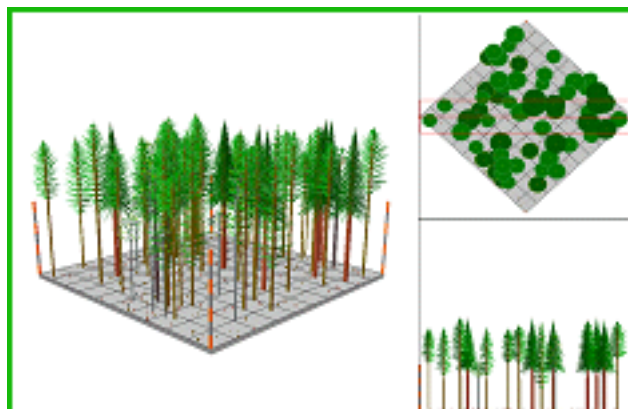
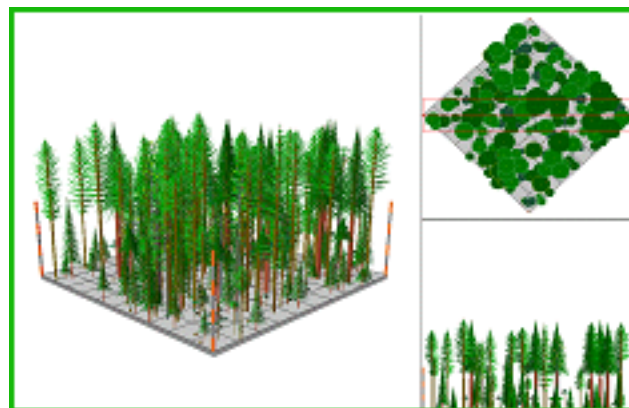
Fuels planning: Science synthesis and integration, an interagency research/management partnership to support the Ten-Year Fire Plan, led by Russell T. Graham, RMRS, and Sarah M. McCaffrey, NCRS.

### **Tools for Visualization**

The software described in this fact sheet provides managers with tools for visualizing forest and fuels information. Computer-based landscape simulations can help visualize stand and landscape conditions and the effects of different management treatments and fuel changes over time. These visualizations can assist forest planning by considering a range of management options, as well as facilitate communication with a variety of users including the general public.

**The Stand Visualization System (SVS)**—Canopy bulk density, canopy base height, and surface fuel loads are excellent descriptors of wildland fuel beds, but these concepts may not be familiar to everyone. Developed by the USDA Forest Service, SVS generates graphic images depicting stand conditions using individual stand components such as trees, shrubs, and downed material. The images produced by SVS provide a readily understood representation of stand conditions and can help communicate forest treatments and management alternatives to a variety of audiences. For more information on SVS, visit: <http://forsys.cfr.washington.edu/svs.html>

**Visualization** of pre-treatment (top) and posttreatment (bottom) mixed conifer stand using the Stand Visualization System (SVS).



**Calibrated Log Models**—Surface fuel loadings play an important role in fire behavior because they affect fireline intensity and flame length. Managers often need to treat surface fuels instead of (or in addition to) treating canopy fuels. Surface fuel loadings can be reduced through prescribed burning, mechanical compaction, and removal from the site. Calibrated log models are created using field measurements and photographs of actual woody debris. The intent of the log models is to provide accurate, visually realistic representations of downed fuels in various size classes. The models do not represent highly detailed log form, individual branch locations, or orientations.



**Calibrated log models:** image of surface fuels rendered using EnVision.

**The Landscape Management System (LMS)**—Developed cooperatively by the University of Washington College of Forest Resources, Yale University School of Forestry and Environmental Studies, and the USDA Forest Service, LMS is a Microsoft Windows® tool that automates the tasks of graphical and tabular summarization, stand visualization, stand projection, and landscape visualization. Visualizations provided by LMS in concert with SVS, EnVision, and other computer programs

can be used to show changing habitats, fire hazards, and other forest characteristics. LMS integrates a variety of applications to facilitate more informed landscape, ecosystem, and watershed management. LMS can project changes in individual stands and landscapes up to 50,000 acres. It can be used on any forested region for which there is a growth model and appropriate inventory information, and can be used for management, planning, policymaking, and education. For more information on LMS, visit: <http://lms.cfr.washington.edu>

**Landscape Visualization (EnVision)**—Developed by the USDA Forest Service, EnVision is a tool for projects involving individual or multiple forest stands, building on many of the concepts used to develop preceding tools such as SVS. EnVision is based on a digital terrain model that defines the ground surface. Color and texture maps show ground surface characteristics and can create “synthetic aerial photos” or highlight areas of interest, such as roads, streams, or observation points. The minimum data requirements are a digital terrain model, a polygon overlay that delineates individual stands or whole landscapes, and stand inventory data or SVS files to represent each stand on the landscape. For more information on Envision, visit: <http://www.fs.fed.us/pnw/envision>



**Image of a watershed:** rendered using the Landscape Management System.

## Other Forest Structure and Fire Hazard Fact Sheets

Look for other fact sheet topics from the Forest Structure and Fire Hazard Team with information about fire hazard, visualization, silviculture, uncertainty, and larger scale treatments.

## Fuels Planning: Synthesis and Integration

This fact sheet is one in a series being produced as part of a larger project supported by the USDA Forest Service to synthesize new knowledge and information relevant to fire and fuels management. Fact sheets address topics related to stand structure, environmental impacts, economics, and human responses to these factors. Information in the fact sheets is targeted for the dry forests of the Inland West, but is often applicable across broad regions of the country. For more information, please visit our Web site at: [www.fs.fed.us/fire/tech\\_transfer/synthesis/synthesis\\_index](http://www.fs.fed.us/fire/tech_transfer/synthesis/synthesis_index)

*The Fuels Planning fact sheets are based on preliminary findings. Information from fact sheets will be synthesized in an upcoming publication.*